



Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
DUST MANAGEMENT FOR PEN SURFACES
CODE 375
(ac)

DEFINITION

Reducing or preventing the emissions of particulate matter (i.e., dust) arising from animal activity on pen surfaces at animal feeding operations.

PURPOSE

This practice is used to accomplish the following purpose:

- Reduce emissions of particulate matter

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to any pen surface (e.g., open lot area, holding pen, corral, working alley, or other similar area where animals are confined) that may be subject to animal activity at animal feeding operations (AFOs). It is particularly important for AFOs in drier climates located close to major roadways and/or populated areas.

CRITERIA

General Criteria Applicable to All Purposes

Prior to installation of this practice, incorporate a dust prevention and control strategy for mitigating dust emissions from animal activity on pen surfaces into the conservation plan.

Additional Criteria for Manure Harvesting

When manure harvesting is a planned activity for mitigating dust emissions from animal activity on pen surfaces, incorporate a manure harvesting section into the conservation plan.

Remove manure from pen surfaces at least once a year (manure cleanout). Additionally, conduct more frequent manure harvesting according to the schedule identified in the manure harvesting section of the conservation plan. When manure harvesting, leave a layer of 1–2 inches of well-compacted manure above the mineral soil in the pen surface.

Additional Criteria for Increased Stocking Density

When normal animal stocking densities do not supply sufficient moisture for dust management through manure and urine addition, increase animal stocking density by either adding animals to the pen or reducing pen surface area (i.e., fencing) without reducing per animal feed bunk space.

Additional Criteria for Mobile Water Application

Apply water with tanker trucks or trailers equipped with hoses or nozzles designed to apply water at rates and amounts that achieve the intended reduction in dust emissions, while avoiding excessive runoff or

ponding on pen surfaces. The minimum design application amount is equal to the maximum total daily wet soil evaporation, with allowances for moisture input to pen surfaces from animal manure and urine.

Water Supply

Ensure the water supply of the animal feeding operation is adequate and available to meet other operating needs during operation of the mobile system. If temporary water storage is required to meet the flow rate required for proper sprinkler operation, such storage should meet the applicable design criteria in other NRCS Conservation Practice Standards (CPSs), such as Irrigation Reservoir (Code 436), Pond (Code 378), or Waste Storage Facility (Code 313).

Water Quality

Use wastewater or fresh water for dust control.

CONSIDERATIONS

Some sites may require an approach that uses a combination of measures for dust management. For example, manure harvesting can reduce water application demand as there is less organic material on the open lot surface. Less organic material would require less water to increase the moisture content of the surface material.

Pull-type manure harvesting equipment, such as a box scraper, will allow for a more even, smooth surface than push-type manure equipment, such as a front-end loader. A more even, smooth surface is preferable to allow for proper moisture management on the pen surface.

Pen surface shaping and smoothing of animal holding areas may be applied to prevent water ponding and chronic wet areas. Water ponding and chronic wet areas can increase emissions of other air pollutants, such as ammonia, volatile organic compounds (VOCs), odorous sulfur compounds, methane, and nitrous oxide.

To minimize the potential for odor emissions while also reducing dust emissions, maintain moisture content in the open lot surface between 25–40 percent.

In areas where the water supply is limited, mobile water applications can be more efficient if applied in late afternoon, which is just prior to the normal time for significant animal activity and weather conditions that would typically contribute to dust impacts.

To improve the efficiency of dust mitigation efforts, conduct manure harvesting and/or mobile water application with consideration of forecasted or anticipated weather conditions. For example, conducting mobile water applications prior to a predicted wind event can reduce the amount of dust generated from the pen surface.

For animal facilities where it is practical to grow vegetative cover, consider the use of NRCS CPSs Critical Area Planting (Code 342) or Heavy Use Area Protection (Code 561) to establish vegetation or protect the surface from damage from animals and reduce fugitive dust generated from animal use of the area.

NRCS CPS Mulching (Code 484) may also be used with or without the establishment of vegetative cover to reduce dust generated from animal activity.

Consider the use of barriers placed at right angles to prevailing wind currents at intervals of about 15 times the barrier height. Windbreaks, shelterbelts, solid fences, snow fences, burlap fences, crate walls, bales of hay, tire bales, and similar material can be used to control air currents and blown soil. For detailed windbreak/shelterbelt criteria, see NRCS CPS Windbreak/Shelterbelt Establishment (Code 380).

For areas that are not subject to animal activity, additional practices, such as applying mulch (NRCS CPS Mulching (Code 484)), establishing vegetation (CPSs Critical Area Planting (Code 342), or Heavy Use Area Protection (Code 561)), use of environmentally acceptable dust suppressants (NRCS CPS Dust

Control on Unpaved Roads and Surfaces (Code 373)), and the use of wind barriers (CPS Windbreak/Shelterbelt Establishment (Code 380)) may be applied to provide additional dust control.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for applying this practice for each pen surface and record them using approved practice specifications, job sheets, or other acceptable documentation with narrative statements that describe the site-specific details of the installation, including—

- Dust control plan that includes information on the operation and maintenance plan.
- Plan view map identifying areas of dust emissions and management methods to be employed.

OPERATION AND MAINTENANCE

Record the following activities and weather information, as applicable:

- Daily precipitation
- Manure removal quantities and dates for manure harvesting
- Animal stocking densities, and dates and times for mobile water application
- Conduct annual self-inspection of dust management activities and add findings to the dust prevention and control plan

Make changes to the dust prevention and control strategy for mitigating dust emissions from animal activity on pen surfaces in the site conservation plan as necessary.

Modifications to activities and use of measures are allowed temporarily to accommodate emergency-level contingencies such as wildfire, hurricane, drought, or flood as long as resource conditions are maintained.

REFERENCES

Auvermann, B.W. 2001. Lesson 42: Controlling Dust and Odor from Open-Lot Livestock Facilities. In: Livestock and Poultry Environmental Stewardship Curriculum (R. Koelsch and F. Humenik, eds.), MidWest Plan Service, Ames, IA.

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Bush, K.J., K.R. Heflin, G.W. Marek, T.C. Bryant, and B.W. Auvermann. 2014. Increasing Stocking Density Reduces Emissions of Fugitive Dust from Cattle Feedyards. *Applied Engineering in Agriculture*, Vol 30(5), 815-824. ISSN 0883-8542 DOI 10.13031/aea.30.10681.

Mukhtar, S., and B.W. Auvermann. 2009. Improving the Air Quality of Animal Feeding Operations with Proper Facility and Manure Management. Extension Service Publication E-585. Texas A&M AgriLife Extension Service. College Station, TX.

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